



U.S. Environmental Protection Agency
Region 8
Technical and Management Services

Laboratory Services Program

Certificate of Analysis: Preliminary Report

Ref: 8TMS-L

MEMORANDUM

Date: 08/07/15

Subject: Analytical Results--- **Upper Animas_Surface Water_AUG 2015_A096 / A-098**

From: Don Goodrich; EPA Region8 Analytical Chemistry WAM

To: Paula Schmitt
Superfund
8 EPR-SR

Received Sample Set(s), [Work Order : Date Received]:
[C150801 : 08/06/2015]

Attached are the analytical results for the samples received from the Upper Animas_Surface Water_AUG 2015_A096 sampling event, according to TDF A-098. All analyses were performed within their method specified holding times unless otherwise noted in the following narrative.

These samples were prepared, analyzed, and verified by the Environmental Services Assistance Team Laboratory (ESAT) according to the requirements of the Technical Direction Form (TDF).

Note: The laboratory herewith transmits this deliverable to the program/project partner for determination of "final data usability" which may include data validation and data quality assessment per and in accordance with EPA QA/G-8, *Guidance on Environmental Data Verification and Data Validation*, November 2002, EPA/240/R-02/004. Laboratory data qualifiers are applied based on the USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, October 2004, referred to as "NFGI".

Laboratory policy is to dispose of any remaining sample 60 days after data analysis packages are delivered to EPA. If you would like the laboratory to retain the samples for a period longer than 60 days, please contact Don Goodrich within the 60 day period at (303) 312-6687.

Case Narrative

C150801

Quality Assessment: Unless indicated by exception, the QA/QC associated with this sample set produced data within the TDF-specified criteria.

Holding Times: All samples were analyzed within their method-specified technical holding time(s).

1. Initial and Continuing calibration blanks (ICBs and CCBs).
Exceptions: None.
2. Preparation (PB) / Method blanks (MB)
Exceptions: None.
3. Interference Checks (ICSA / ICSAB) for ICP-MS and ICP-OE analyses only.
Exceptions: None.
4. Initial and Continuing calibration verification analyses (ICVs, SCVs and CCVs).
Exceptions: None.
5. Laboratory Control Sample (LCS) or second source analysis or SRM.
Exceptions: None.
6. Laboratory Fortified blank (LFB) / Blank spike (BS), same source as used for the matrix spikes.
PBS performed with analyses/methods requiring preparation or digestion prior to analysis.
Exceptions: None.
7. Contract Reporting Detection Limit Standard, labeled as CRA, CRDL or CRL.
Exceptions: None.
8. Laboratory Duplicate (DUP). "Source" identifies field sample duplicated in the laboratory. If either the "source" or the duplicate result is <5X the reporting limit, the %D limit of 20% does not apply.
Exceptions: In ICP-MS batch 1508028, lead recovered high in the DUP. As a result, the source sample was qualified "J" as estimated for lead.
9. Laboratory Matrix Spike (MS) and spike duplicate (MSD). "Source" defines original field sample fortified prior to analysis. Percent recovery (%R) limits do not apply when sample concentration(s) exceed the corresponding analyte spike level by a factor of 4 or greater.
Exceptions: None.
10. Serial Dilution sample analysis (SRD). "Source" is parent field sample diluted 1:5 in the laboratory. Performed for ICP-OE and ICP-MS metals analyses. Percent difference (%D) limits do not apply when analyte concentration(s) are below 50x the source sample's MDL (or 10x it's PQL).
Exceptions: None.
11. Internal standards, criteria specified for ICP-MS analyses only, monitored at the instrument.
Exceptions: None.
12. Any calibration using more than two-points produced a correlation coefficient equal to or greater than 0.995.
Exceptions: None.

Acronyms and Definitions:

ESAT	Environmental Services Assistance Team
J	Data Estimated qualifier (also applied to all data less than PQL, greater than or equal to MDL)
MDL	Method Detection Limit
PQL	Practical Quantitation Limit, also known as reporting limit.
RPD	Relative Percent Difference (difference divided by the mean)
%D	Percent difference, serial dilution criteria unit, difference divided by the original result
%R	Percent recovery, analyzed (less sample contribution) divided by true value
<	Analyte NOT DETECTED at or above the Method Detection Limit (MDL)
mg/L	Parts per million (milligrams per liter). Solids equivalent = mg/Kg.
ug/L	Parts per billion (micrograms per liter). Solids equivalent = ug/Kg.
NR	No Recovery (matrix spike) - Often seen for calcium/magnesium when their concentration exceeds the spike level by > 4x.
NFGI	USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review/October 2004
RE	Sample Re-analysis. Usually seen on raw data and sequences for required sample dilutions due to over-range analytes.
U	Analyte not detected at or above MDL qualifier
D	Diluted value qualifier.

Method(s) Summary :

As defined in the Technical Direction Form (TDF), some or all of the methods listed below were used for the determination of the reported target analytes.

From EPA's *Methods for the Determination of Metals in Environmental Samples*, Supplement I, May 1994, dissolved, total, and/or total recoverable metals were determined by:

- Method 200.7 / 6010B using a PE Optima ICP -OE (ICP).
- Method 200.8 / 6020 using a Perkin -Elmer Elan 6000 ICP -MS.
- Method 200.2 for total recoverable metals (only) digestion.
- Method 245.1 using a Perkin -Elmer FIMS CV AA (aqueous mercury only).

From *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, 1992, Method 2340B was used for the calculated hardness determination. Hardness is reported as mg (milligram) equivalent CaCO₃ per liter (L) determined as follows:

$$\text{Calculated hardness} = 2.497 * (\text{Calcium, mg/L}) + 4.118 * (\text{Magnesium, mg/L}).$$

From EPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846,

- Method 3015A was used for microwave assisted total metals digestion.
- Method 7473 was used for mercury in solids.

From EPA's *Determination of Inorganic Anions by Ion Chromatography*, Revision 2.1, 1993, Method 300.0 was used to determine the anions.

From EPA's *Methods for Chemical Analysis of Water and Wastes*, March 1983:

- Method 310.1 was followed for the alkalinity determination.
- Method 160.1 was followed for gravimetric total dissolved solids (TDS) determination.
- Method 160.2 was used for gravimetric total suspended solids (TSS) determination.
- Method 415.3 was used for total organic carbon (TOC) determination using either an Apollo 9000 or Phoenix 8000 Non-Dispersive IR (NDIR) system. Also known as dissolved organic carbon (DOC) when performed on the dissolved sample fraction.

The quality control procedures listed in the TDF request were utilized by ESAT to verify accuracy of the results and to evaluate any matrix interferences.

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: 32nd St Bridge

Date / Time Sampled: 08/06/15 09:45

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-01 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	46.8	J	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	3.31	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	3.46	J	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: 32nd St Bridge

Date / Time Sampled: 08/05/15 20:50

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-03 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	49.9	J	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	2.70	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	2.56		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	12.0		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

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Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: 32nd St Bridge

Date / Time Sampled: 08/06/15 00:40

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-05 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	48.8	J	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	1.80		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	13.2		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

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Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/05/15 16:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-07 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	< 50.0	U	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	0.724	J	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	6.15		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	1.77		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

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Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/06/15 06:15

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-09 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	< 50.0	U	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	0.703	J	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	4.63	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	1.55		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/05/15 19:15

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-11 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	< 50.0	U	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	0.652	J	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	4.14	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	1.54		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

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Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A68

Date / Time Sampled: 08/05/15 23:30

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-13 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	< 50.0	U	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	0.717	J	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	4.89	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	2.18		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

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Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 16:15

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-15 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 100	U	ug/L	50.0	100	08/07/2015	SV	1508028
200.8	Arsenic	1080		ug/L	50.0	100	08/07/2015	SV	1508028
200.8	Barium	1410		ug/L	500	100	08/07/2015	SV	1508028
200.8	Cadmium	28.3		ug/L	10.0	100	08/07/2015	SV	1508028
200.8	Chromium	< 200	U	ug/L	100	100	08/07/2015	SV	1508028
200.8	Cobalt	54.1		ug/L	10.0	100	08/07/2015	SV	1508028
200.8	Copper	4820		ug/L	50.0	100	08/07/2015	SV	1508028
200.8	Lead	25600		ug/L	10.0	100	08/07/2015	SV	1508028
200.8	Molybdenum	268		ug/L	100	100	08/07/2015	SV	1508028
200.8	Nickel	< 100	U	ug/L	50.0	100	08/07/2015	SV	1508028
200.8	Selenium	< 200	U	ug/L	100	100	08/07/2015	SV	1508028
200.8	Silver	149		ug/L	50.0	100	08/07/2015	SV	1508028
200.8	Thallium	< 100	U	ug/L	50.0	100	08/07/2015	SV	1508028
200.8	Vanadium	677		ug/L	200	100	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 13:45

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-17 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	6.17		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	28.9		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	168		ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	2.27		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	7.04		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	49.3		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	214		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	4.33	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	18.3		ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

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Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/06/15 06:30

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-19 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	15.7		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	31.2	J	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	2.34		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	5.24		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	113		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	88.3		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	3.54	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	12.4	J	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 20:10

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-21 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	10.2		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	116		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	111		ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	4.69		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	10.6		ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	9.51		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	542		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	1390		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	23.2		ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	6.61		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	8.25		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	80.7		ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: A72

Date / Time Sampled: 08/05/15 23:50

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-23 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	2.66	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	27.1		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	47.6	J	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	3.23		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	5.92		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	180		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	301		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	5.89		ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	3.75	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	18.7		ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: Bakers Bridge

Date / Time Sampled: 08/06/15 00:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-25 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	30.7	J	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	1.12		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	4.15	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	1.50		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: Bakers Bridge

Date / Time Sampled: 08/06/15 09:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-27 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	19.9	J	ug/L	12.5	25	08/07/2015	SV	1508028
200.8	Arsenic	264		ug/L	12.5	25	08/07/2015	SV	1508028
200.8	Barium	341		ug/L	125	25	08/07/2015	SV	1508028
200.8	Cadmium	6.13		ug/L	2.50	25	08/07/2015	SV	1508028
200.8	Chromium	< 50.0	U	ug/L	25.0	25	08/07/2015	SV	1508028
200.8	Cobalt	12.8		ug/L	2.50	25	08/07/2015	SV	1508028
200.8	Copper	1120		ug/L	12.5	25	08/07/2015	SV	1508028
200.8	Lead	5720		ug/L	2.50	25	08/07/2015	SV	1508028
200.8	Molybdenum	66.9		ug/L	25.0	25	08/07/2015	SV	1508028
200.8	Nickel	< 25.0	U	ug/L	12.5	25	08/07/2015	SV	1508028
200.8	Selenium	< 50.0	U	ug/L	25.0	25	08/07/2015	SV	1508028
200.8	Silver	37.8		ug/L	12.5	25	08/07/2015	SV	1508028
200.8	Thallium	< 25.0	U	ug/L	12.5	25	08/07/2015	SV	1508028
200.8	Vanadium	172		ug/L	50.0	25	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: Bakers Bridge

Date / Time Sampled: 08/05/15 20:05

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-29 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	< 10.0	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	29.9	J	ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	< 1.00	U	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	0.975	J	ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	4.03	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	3.45		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	< 5.00	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	< 15.0	U	ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: CC48

Date / Time Sampled: 08/06/15 06:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-31 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	6.79		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Arsenic	98.5		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Barium	52.3		ug/L	25.0	5	08/07/2015	SV	1508028
200.8	Cadmium	14.5		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Chromium	6.62	J	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Cobalt	29.8		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Copper	909		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Lead	536		ug/L	0.500	5	08/07/2015	SV	1508028
200.8	Molybdenum	14.3		ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Nickel	14.8		ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Selenium	< 10.0	U	ug/L	5.00	5	08/07/2015	SV	1508028
200.8	Silver	2.53	J	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Thallium	< 5.00	U	ug/L	2.50	5	08/07/2015	SV	1508028
200.8	Vanadium	67.3		ug/L	10.0	5	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: CC48

Date / Time Sampled: 08/05/15 23:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-33 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	14.1		ug/L	5.00	10	08/07/2015	SV	1508028
200.8	Arsenic	203		ug/L	5.00	10	08/07/2015	SV	1508028
200.8	Barium	159		ug/L	50.0	10	08/07/2015	SV	1508028
200.8	Cadmium	18.5		ug/L	1.00	10	08/07/2015	SV	1508028
200.8	Chromium	17.2	J	ug/L	10.0	10	08/07/2015	SV	1508028
200.8	Cobalt	39.1		ug/L	1.00	10	08/07/2015	SV	1508028
200.8	Copper	1480		ug/L	5.00	10	08/07/2015	SV	1508028
200.8	Lead	2010		ug/L	1.00	10	08/07/2015	SV	1508028
200.8	Molybdenum	36.5		ug/L	10.0	10	08/07/2015	SV	1508028
200.8	Nickel	20.8		ug/L	5.00	10	08/07/2015	SV	1508028
200.8	Selenium	10.1	J	ug/L	10.0	10	08/07/2015	SV	1508028
200.8	Silver	10.8		ug/L	5.00	10	08/07/2015	SV	1508028
200.8	Thallium	< 10.0	U	ug/L	5.00	10	08/07/2015	SV	1508028
200.8	Vanadium	131		ug/L	20.0	10	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: CC48

Date / Time Sampled: 08/05/15 19:25

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-35 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	35.1	J	ug/L	25.0	50	08/07/2015	SV	1508028
200.8	Arsenic	732		ug/L	25.0	50	08/07/2015	SV	1508028
200.8	Barium	439	J	ug/L	250	50	08/07/2015	SV	1508028
200.8	Cadmium	30.6		ug/L	5.00	50	08/07/2015	SV	1508028
200.8	Chromium	< 100	U	ug/L	50.0	50	08/07/2015	SV	1508028
200.8	Cobalt	59.8		ug/L	5.00	50	08/07/2015	SV	1508028
200.8	Copper	3620		ug/L	25.0	50	08/07/2015	SV	1508028
200.8	Lead	7530		ug/L	5.00	50	08/07/2015	SV	1508028
200.8	Molybdenum	138		ug/L	50.0	50	08/07/2015	SV	1508028
200.8	Nickel	36.0	J	ug/L	25.0	50	08/07/2015	SV	1508028
200.8	Selenium	< 100	U	ug/L	50.0	50	08/07/2015	SV	1508028
200.8	Silver	45.7	J	ug/L	25.0	50	08/07/2015	SV	1508028
200.8	Thallium	< 50.0	U	ug/L	25.0	50	08/07/2015	SV	1508028
200.8	Vanadium	455		ug/L	100	50	08/07/2015	SV	1508028

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods

Station ID: Cement Creek 14th St Bridge

Date / Time Sampled: 08/05/15 16:00

Workorder: C150801

EPA Tag No:

Matrix: Surface Water

Lab Number: C150801-37 A

Method	Parameter	Results	Qualifier	Units	MDL	Dilution Factor	Analyzed	By	Batch
200.8	Antimony	321	J	ug/L	250	50	08/07/2015	SV	1508028
200.8	Arsenic	8230		ug/L	250	50	08/07/2015	SV	1508028
200.8	Barium	9730		ug/L	2500	50	08/07/2015	SV	1508028
200.8	Cadmium	165		ug/L	50.0	50	08/07/2015	SV	1508028
200.8	Chromium	706	J	ug/L	500	50	08/07/2015	SV	1508028
200.8	Cobalt	384		ug/L	50.0	50	08/07/2015	SV	1508028
200.8	Copper	36700		ug/L	250	50	08/07/2015	SV	1508028
200.8	Lead	179000		ug/L	50.0	50	08/07/2015	SV	1508028
200.8	Molybdenum	2010		ug/L	500	50	08/07/2015	SV	1508028
200.8	Nickel	276	J	ug/L	250	50	08/07/2015	SV	1508028
200.8	Selenium	< 1000	U	ug/L	500	50	08/07/2015	SV	1508028
200.8	Silver	1110		ug/L	250	50	08/07/2015	SV	1508028
200.8	Thallium	< 500	U	ug/L	250	50	08/07/2015	SV	1508028
200.8	Vanadium	5470		ug/L	1000	50	08/07/2015	SV	1508028

"J" Qualifier indicates an estimated value

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	% R	% R Limits	% D or RPD	% D or RPD Limit
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ICPMS-PE DRC-II

Batch 1508028 - 200.2 - TR Metals

Water

ICPMS-PE DRC-II

Method Blank (1508028-BLK2)

Dilution Factor: 5

Prepared & Analyzed: 08/07/15

Vanadium	< 10.0	15.0	ug/L
Chromium	< 5.00	10.0	"
Cobalt	< 0.500	1.00	"
Nickel	< 2.50	5.00	"
Copper	< 2.50	5.00	"
Arsenic	< 2.50	10.0	"
Selenium	< 5.00	10.0	"
Molybdenum	< 5.00	5.00	"
Silver	< 2.50	5.00	"
Cadmium	< 0.500	1.00	"
Antimony	< 2.50	5.00	"
Barium	< 25.0	50.0	"
Thallium	< 2.50	5.00	"
Lead	< 0.500	1.00	"

Duplicate (1508028-DUP2)

Dilution Factor: 5

Source: C150801-01

Prepared & Analyzed: 08/07/15

Vanadium	< 10.0	15.0	ug/L	< 10.0		20
Chromium	< 5.00	10.0	"	< 5.00		20
Cobalt	< 0.500	1.00	"	< 0.500		20
Nickel	< 2.50	5.00	"	< 2.50		20
Copper	8.535	5.00	"	3.309	88	20
Arsenic	< 2.50	10.0	"	< 2.50		20
Selenium	< 5.00	10.0	"	< 5.00		20
Molybdenum	< 5.00	5.00	"	< 5.00		20
Silver	< 2.50	5.00	"	< 2.50		20
Cadmium	< 0.500	1.00	"	< 0.500		20
Antimony	< 2.50	5.00	"	< 2.50		20
Barium	48.88	50.0	"	46.77	4	20
Thallium	< 2.50	5.00	"	< 2.50		20
Lead	46.84	1.00	"	3.461	172	20

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	% R Limits	% D or RPD	% D or RPD Limit
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Batch 1508028 - 200.2 - TR Metals

Water

ICPMS-PE DRC-II

Matrix Spike (1508028-MS2)

Dilution Factor: 5

Source: C150801-01

Prepared & Analyzed: 08/07/15

Vanadium	288.1	15.0	ug/L	300	< 10.0	96	70-130		
Chromium	381.1	10.0	"	400	< 5.00	95	70-130		
Cobalt	190.2	1.00	"	200	< 0.500	95	70-130		
Nickel	463.4	5.00	"	500	< 2.50	93	70-130		
Copper	283.0	5.00	"	300	3.309	93	70-130		
Arsenic	815.5	10.0	"	800	< 2.50	102	70-130		
Selenium	2056	10.0	"	2000	< 5.00	103	70-130		
Molybdenum	399.6	5.00	"	400	< 5.00	100	70-130		
Silver	72.71	5.00	"	75.0	< 2.50	97	70-130		
Cadmium	205.8	1.00	"	200	< 0.500	103	70-130		
Antimony	802.5	5.00	"	800	< 2.50	100	70-130		
Barium	247.2	50.0	"	200	46.77	100	70-130		
Thallium	1916	5.00	"	2000	< 2.50	96	70-130		
Lead	974.1	1.00	"	1000	3.461	97	70-130		

Matrix Spike (1508028-MS4)

Dilution Factor: 5

Source: C150801-03

Prepared & Analyzed: 08/07/15

Vanadium	276.5	15.0	ug/L	300	< 10.0	92	70-130		
Chromium	381.7	10.0	"	400	< 5.00	95	70-130		
Cobalt	193.2	1.00	"	200	< 0.500	97	70-130		
Nickel	469.8	5.00	"	500	< 2.50	94	70-130		
Copper	287.7	5.00	"	300	2.702	95	70-130		
Arsenic	800.9	10.0	"	800	< 2.50	100	70-130		
Selenium	2015	10.0	"	2000	< 5.00	101	70-130		
Molybdenum	389.7	5.00	"	400	< 5.00	97	70-130		
Silver	69.86	5.00	"	75.0	< 2.50	93	70-130		
Cadmium	199.5	1.00	"	200	< 0.500	100	70-130		
Antimony	807.1	5.00	"	800	< 2.50	101	70-130		
Barium	246.7	50.0	"	200	49.88	98	70-130		
Thallium	1935	5.00	"	2000	12.03	96	70-130		
Lead	985.1	1.00	"	1000	2.561	98	70-130		

Project Name: Upper Animas_Surface Water_AUG 2015_A096

Certificate of Analysis

TDF #: A-098

Preliminary Report

Metals (Total Recov) by EPA 200/7000 Series Methods - Quality Control

TechLaw, Inc. - ESAT Region 8

Analyte	Result	Det. Limit	Units	Spike Level	Source Result	%R	% R Limits	% D or RPD	% D or RPD Limit
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Batch 1508028 - 200.2 - TR Metals

Water

ICPMS-PE DRC-II

Reference (1508028-SRM2)

Dilution Factor: 2

Prepared & Analyzed: 08/07/15

Vanadium	935.8	60.0	ug/L	1000		94	85-115		
Chromium	952.8	40.0	"	1000		95	85-115		
Cobalt	980.1	4.00	"	1000		98	85-115		
Nickel	954.4	20.0	"	1000		95	85-115		
Copper	961.2	20.0	"	1000		96	85-115		
Arsenic	2105	40.0	"	2000		105	85-115		
Selenium	1056	40.0	"	1000		106	85-115		
Molybdenum	1028	20.0	"	1000		103	85-115		
Silver	249.4	20.0	"	250		100	85-115		
Cadmium	993.8	4.00	"	1000		99	85-115		
Antimony	2053	20.0	"	2000		103	85-115		
Barium	993.4	200	"	1000		99	85-115		
Thallium	4826	20.0	"	5000		97	85-115		
Lead	1939	4.00	"	2000		97	85-115		

Batch 1508033 - 1508028

Water

ICPMS-PE DRC-II

Serial Dilution (1508033-SRD1)

Dilution Factor: 2

Source: C150801-01

Prepared & Analyzed: 08/07/15

Vanadium	< 50.0	75.0	ug/L	< 10.00					10
Chromium	< 25.0	50.0	"	< 5.00					10
Cobalt	< 2.50	5.00	"	< 0.50					10
Nickel	< 12.5	25.0	"	< 2.50					10
Copper	< 12.5	25.0	"	3.309					10
Arsenic	< 12.5	50.0	"	< 2.50					10
Selenium	< 25.0	50.0	"	< 5.00					10
Molybdenum	< 25.0	25.0	"	< 5.00					200
Silver	< 12.5	25.0	"	< 2.50					10
Cadmium	< 2.50	5.00	"	< 0.50					10
Antimony	< 12.5	25.0	"	< 2.50					10
Barium	< 125	250	"	46.77					10
Thallium	< 12.5	25.0	"	< 2.50					10
Lead	3.217	5.00	"	3.461				7	10

NOTE: %R = % Recovery, %R limits do not apply when sample levels exceed 4x the spike level.
 RPD = Relative Percent Difference, %D = % Difference, DL = Detection Limit for QC sample

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis
Preliminary ReportTechLaw Inc, ESAT Region8
INORGANIC ANALYSES DATA SHEET
Initial and Continuing Calibration Blanks

Analytical Method: 200.8

Analysis Name: ICPMS Tot. Rec. Metals

Instrument: ICPMS-PE DRC-II

Work Order: Nu C150801

Analytical Sequence: 1508033 Total Recoverable

Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Vanadium	0.04	1	2	3	4	NA	1508028-BLK2	3.00
		0.07	0.19	0.10	0.06	NA	-0.53	
		5	6	7	8			
		0.22	0.15	0.02				
Chromium	-0.02	1	2	3	4	NA	1508028-BLK2	2.00
		0.05	0.00	0.04	0.00	NA	0.44	
		5	6	7	8			
		-0.02	0.01	-0.02				
Cobalt	0.01	1	2	3	4	NA	1508028-BLK2	0.20
		0.01	0.01	0.02	0.01	NA	-0.02	
		5	6	7	8			
		0.04	0.07	0.03				
Nickel	0.01	1	2	3	4	NA	1508028-BLK2	1.00
		0.02	0.03	0.02	0.06	NA	-0.01	
		5	6	7	8			
		0.07	0.12	0.09				
Copper	-0.03	1	2	3	4	NA	1508028-BLK2	1.00
		-0.03	0.00	0.01	-0.01	NA	0.00	
		5	6	7	8			
		0.01	0.05	0.00				
Arsenic	0.06	1	2	3	4	NA	1508028-BLK2	2.00
		-0.01	0.07	-0.03	0.05	NA	-0.15	
		5	6	7	8			
		-0.01	0.01	0.04				
Selenium	0.15	1	2	3	4	NA	1508028-BLK2	2.00
		-0.18	0.11	-0.06	0.39	NA	0.02	
		5	6	7	8			
		-0.13	0.03	0.17				
Molybdenum	0.03	1	2	3	4	NA	1508028-BLK2	1.00
		0.05	0.04	0.05	0.04	NA	-0.01	
		5	6	7	8			
		0.05	0.09	0.06				

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis
Preliminary ReportTechLaw Inc, ESAT Region8
INORGANIC ANALYSES DATA SHEET
Initial and Continuing Calibration Blanks

Analytical Method: 200.8

Analysis Name: ICPMS Tot. Rec. Metals

Instrument: ICPMS-PE DRC-II

Work Order: Nu C150801

Analytical Sequence: 1508033 Total Recoverable

Concentration Units: ug/L

Blank criteria = +/- 5x analyte MDL (+/- PQL)

Analyte	Initial Calibration Blank (1 & 2)	Continuing Calibration Blanks				Method Blank (Batch ID)		PQL
Silver	0.02	1	2	3	4	NA	1508028-BLK2	1.00
		0.03	0.03	0.03	0.01	NA	-0.01	
		5	6	7	8			
		0.04	0.08	0.04				
Cadmium	0.01	1	2	3	4	NA	1508028-BLK2	0.20
		0.00	0.03	0.03	0.01	NA	-0.01	
		5	6	7	8			
		0.06	0.06	0.06				
Antimony	0.08	1	2	3	4	NA	1508028-BLK2	1.00
		0.17	0.20	0.20	0.17	NA	-0.02	
		5	6	7	8			
		0.22	0.20	0.21				
Barium	0.01	1	2	3	4	NA	1508028-BLK2	10.00
		0.00	0.02	0.01	0.03	NA	-0.02	
		5	6	7	8			
		0.05	0.05	0.05				
Thallium	0.01	1	2	3	4	NA	1508028-BLK2	1.00
		0.00	0.00	0.00	0.26	NA	-0.07	
		5	6	7	8			
		0.10	0.10	0.06				
Lead	0.01	1	2	3	4	NA	1508028-BLK2	0.20
		0.01	0.02	0.02	0.02	NA	-0.01	
		5	6	7	8			
		0.07	0.11	0.07				

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II

Method: 200.8

Analysis Name: ICPMS Tot. Rec. Metals

Sequence: 1508033

Work Order: C150801

Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Antimony	50.0	50.08	100.2		1			2			3	
				50.0	48.59	97.2	50.0	49.32	98.6	50.0	49.60	99.2
					4			5			6	
				50.0	50.57	101.1	50.0	49.53	99.1	50.0	50.52	101.0
					7			8			9	
				50.0	50.97	101.9						
Arsenic	50.0	51.52	103.0		1			2			3	
				50.0	51.09	102.2	50.0	52.06	104.1	50.0	50.51	101.0
					4			5			6	
				50.0	52.05	104.1	50.0	51.55	103.1	50.0	52.37	104.7
					7			8			9	
				50.0	51.87	103.7						
Barium	50.0	49.79	99.6		1			2			3	
				50.0	50.15	100.3	50.0	50.02	100.0	50.0	52.12	104.2
					4			5			6	
				50.0	52.06	104.1	50.0	51.73	103.5	50.0	52.77	105.5
					7			8			9	
				50.0	51.02	102.0						
Cadmium	50.0	49.47	98.9		1			2			3	
				50.0	51.10	102.2	50.0	51.55	103.1	50.0	50.62	101.2
					4			5			6	
				50.0	49.78	99.6	50.0	52.17	104.3	50.0	52.97	105.9
					7			8			9	
				50.0	52.12	104.2						
Chromium	50.0	48.42	96.8		1			2			3	
				50.0	48.45	96.9	50.0	47.74	95.5	50.0	47.97	95.9
					4			5			6	
				50.0	49.17	98.3	50.0	47.44	94.9	50.0	51.45	102.9
					7			8			9	
				50.0	49.01	98.0						
Cobalt	50.0	49.98	100.0		1			2			3	
				50.0	48.81	97.6	50.0	49.02	98.0	50.0	50.40	100.8
					4			5			6	
				50.0	50.92	101.8	50.0	48.74	97.5	50.0	53.58	107.2
					7			8			9	
				50.0	50.39	100.8						

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II

Method: 200.8

Analysis Name: ICPMS Tot. Rec. Metals

Sequence: 1508033

Work Order: C150801

Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Copper	50.0	48.85	97.7		1			2			3	
				50.0	46.46	92.9	50.0	47.39	94.8	50.0	48.54	97.1
					4			5			6	
				50.0	50.58	101.2	50.0	48.57	97.1	50.0	51.09	102.2
					7			8			9	
				50.0	48.50	97.0						
Lead	50.0	49.25	98.5		1			2			3	
				50.0	50.15	100.3	50.0	50.24	100.5	50.0	49.53	99.1
					4			5			6	
				50.0	50.17	100.3	50.0	51.12	102.2	50.0	52.74	105.5
					7			8			9	
				50.0	53.04	106.1						
Molybdenum	50.0	49.33	98.7		1			2			3	
				50.0	50.76	101.5	50.0	50.99	102.0	50.0	51.86	103.7
					4			5			6	
				50.0	53.13	106.3	50.0	53.26	106.5	50.0	52.91	105.8
					7			8			9	
				50.0	53.41	106.8						
Nickel	50.0	48.45	96.9		1			2			3	
				50.0	47.43	94.9	50.0	48.71	97.4	50.0	49.25	98.5
					4			5			6	
				50.0	49.68	99.4	50.0	48.80	97.6	50.0	52.24	104.5
					7			8			9	
				50.0	49.15	98.3						
Selenium	50.0	53.05	106.1		1			2			3	
				50.0	52.02	104.0	50.0	51.36	102.7	50.0	52.00	104.0
					4			5			6	
				50.0	51.94	103.9	50.0	52.26	104.5	50.0	52.52	105.0
					7			8			9	
				50.0	51.76	103.5						
Silver	50.0	48.89	97.8		1			2			3	
				50.0	50.00	100.0	50.0	49.91	99.8	50.0	50.30	100.6
					4			5			6	
				50.0	50.40	100.8	50.0	50.03	100.1	50.0	50.95	101.9
					7			8			9	
				50.0	51.36	102.7						

TechLaw, Inc. - ESAT Region 8

Initial and Continuing Calibration Verification Results

ICPMS-PE DRC-II

Method: 200.8

Analysis Name: ICPMS Tot. Rec. Metals

Sequence: 1508033

Work Order: C150801

Units: ug/L

Total Recoverable Analyte	Initial (ICV1, ICV2)			Continuing Calibration Verification Standards (CCVs)								
	True	Found	%R	True	Found	%R	True	Found	%R	True	Found	%R
Thallium	50.0	49.76	99.5	1			2			3		
				50.0	49.82	99.6	50.0	49.30	98.6	50.0	50.10	100.2
				4			5			6		
				50.0	50.19	100.4	50.0	50.62	101.2	50.0	52.71	105.4
				7			8			9		
				50.0	52.99	106.0						
Vanadium	50.0	48.49	97.0	1			2			3		
				50.0	48.70	97.4	50.0	48.43	96.9	50.0	48.29	96.6
				4			5			6		
				50.0	48.95	97.9	50.0	48.71	97.4	50.0	49.88	99.8
				7			8			9		
				50.0	50.05	100.1						

Metals - ICV & CCV %R Criteria = 90 - 110%, Classical Chemistry %R Criteria -ICV = 90 - 110%R, CCV = 80 - 120%R.

TechLaw, Inc. - ESAT Region 8

ICP Interference Check Sample

ICPMS-PE DRC-II

<u>Analyte</u>	<u>Check Sample</u>	<u>Result*</u>	<u>Units</u>	<u>True</u>	<u>%R</u>	<u>PQL</u>
Sequence: 1508033 Analysis: ICPMS Tot. Rec. Metals						
Antimony	IFA1	0.0	ug/L			1.00
	IFB1	0.0	ug/L			1.00
Arsenic	IFA1	0.0	ug/L			2.00
	IFB1	19.9	ug/L	20	100	2.00
Barium	IFA1	0.0	ug/L			10.0
	IFB1	0.1	ug/L			10.0
Cadmium	IFA1	0.0	ug/L			0.200
	IFB1	20.3	ug/L	20	101	0.200
Chromium	IFA1	0.2	ug/L			2.00
	IFB1	20.1	ug/L	20	101	2.00
Cobalt	IFA1	0.0	ug/L			0.200
	IFB1	20.4	ug/L	20	102	0.200
Copper	IFA1	0.5	ug/L			1.00
	IFB1	20.7	ug/L	20	103	1.00
Lead	IFA1	0.0	ug/L			0.200
	IFB1	0.0	ug/L			0.200
Molybdenum	IFA1	197.6	ug/L	200	99	1.00
	IFB1	198.9	ug/L	200	99	1.00
Nickel	IFA1	0.0	ug/L			1.00
	IFB1	20.2	ug/L	20	101	1.00
Selenium	IFA1	0.2	ug/L			2.00
	IFB1	-0.4	ug/L			2.00
Silver	IFA1	0.0	ug/L			1.00
	IFB1	19.1	ug/L	20	96	1.00
Thallium	IFA1	-0.1	ug/L			1.00
	IFB1	-0.1	ug/L			1.00
Vanadium	IFA1	0.2	ug/L			3.00
	IFB1	0.1	ug/L			3.00

*Criteria = 80-120%R of True Value or +/- PQL

See raw data for complete analyte list and results.

TechLaw, Inc. - ESAT Region 8 Detection Limit (PQL) Standard ICPMS-PE DRC-II				
Metals (Total Recov) by EPA 200/7000 Series Methods				
Sequence: 1508033				
Analyte	True	Found	%R	Units
Antimony	1.00	1.034	103	ug/L
Arsenic	2.00	2.045	102	ug/L
Barium	10.0	9.749	97	ug/L
Cadmium	0.200	0.1641	82	ug/L
Chromium	2.00	1.816	91	ug/L
Cobalt	0.200	0.1900	95	ug/L
Copper	1.00	0.7994	80	ug/L
Lead	0.200	0.1862	93	ug/L
Molybdenum	1.00	0.9353	94	ug/L
Nickel	1.00	0.9756	98	ug/L
Selenium	2.00	1.964	98	ug/L
Silver	1.00	0.9570	96	ug/L
Thallium	1.00	0.8921	89	ug/L
Vanadium	2.00	1.989	99	ug/L

Recovery Control Limits: 70-130% except Pb, Tl, Sb, & Hg at 50-150%. No limits for Al, Ca, Fe, K, Mg & Na.

TechLaw Inc, ESAT Region8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8

Total Recoverable

Sequence ID#: 1508033

Instrument ID #: ICPMS-PE DRC-II

Water

LSR #: A-096

Analysis ID	Sample Name	Analysis Date	Analysis Time
1508033-ICV1	Initial Cal Check	08/07/15	08:33
1508033-SCV1	Secondary Cal Check	08/07/15	08:37
1508033-ICB1	Initial Cal Blank	08/07/15	08:40
1508033-CRL1	Instrument RL Check	08/07/15	08:43
1508033-IFA1	Interference Check A	08/07/15	08:47
1508033-IFB1	Interference Check B	08/07/15	08:50
1508033-CCV1	Calibration Check	08/07/15	09:24
1508033-CCB1	Calibration Blank	08/07/15	09:27
1508033-CCV2	Calibration Check	08/07/15	10:02
1508033-CCB2	Calibration Blank	08/07/15	10:05
1508033-CCV3	Calibration Check	08/07/15	10:33
1508033-CCB3	Calibration Blank	08/07/15	10:36
1508028-BLK2	Blank	08/07/15	13:15
C150801-01	32nd St Bridge	08/07/15	13:18
1508028-DUP2	Duplicate	08/07/15	13:21
1508033-SRD1	Serial Dilution	08/07/15	13:24
1508028-SRM2	Reference	08/07/15	13:27
1508028-MS2	Matrix Spike	08/07/15	13:30
C150801-03	32nd St Bridge	08/07/15	13:33
1508028-MS4	Matrix Spike	08/07/15	13:36
C150801-05	32nd St Bridge	08/07/15	13:39
1508033-CCV4	Calibration Check	08/07/15	13:46
1508033-CCB4	Calibration Blank	08/07/15	13:49
C150801-07	A68	08/07/15	13:52
C150801-09	A68	08/07/15	13:55
C150801-11	A68	08/07/15	13:58
C150801-13	A68	08/07/15	14:01
C150801-17	A72	08/07/15	14:08
C150801-19	A72	08/07/15	14:11
C150801-21	A72	08/07/15	14:14
C150801-23	A72	08/07/15	14:17
1508033-CCV5	Calibration Check	08/07/15	14:23
1508033-CCB5	Calibration Blank	08/07/15	14:26
C150801-25	Bakers Bridge	08/07/15	14:30
C150801-29	Bakers Bridge	08/07/15	14:36
C150801-31	CC48	08/07/15	14:39
C150801-33	CC48	08/07/15	14:42
C150801-15	A72	08/07/15	14:54

Project Name: Upper Animas_Surface Water_AUG 2015_A096

TDF #: A-098

Certificate of Analysis
Preliminary Report

TechLaw Inc, ESAT Region 8

INSTRUMENT ANALYSIS SEQUENCE LOG

Analytical Method: 200.8

Total Recoverable

Sequence ID#: 1508033

Instrument ID #: ICPMS-PE DRC-II

Water

LSR #: A-096

Analysis ID	Sample Name	Analysis Date	Analysis Time
C150801-27	Bakers Bridge	08/07/15	14:57
1508033-CCV6	Calibration Check	08/07/15	15:00
1508033-CCB6	Calibration Blank	08/07/15	15:04
C150801-35	CC48	08/07/15	15:07
C150801-37	Cement Creek 14th St Bridge	08/07/15	15:10
1508033-CCV7	Calibration Check	08/07/15	15:13
1508033-CCB7	Calibration Blank	08/07/15	15:17